

CLAIMS

I claim:

1. A device for controlling the temperature on an airfoil component, comprising:
a resistive heater element;
a controller that controls power supply to the resistive heater element;
a plurality of detectors associated with corresponding portions of the resistive heater element at selected intervals along the heater element, the detectors providing the controller resistance information regarding the corresponding portions such that the controller determines a temperature of the corresponding portions based upon the resistance information.
2. The device of claim 1, wherein the resistive heater element comprises a material having a high coefficient of resistance.
3. The device of claim 2, wherein the resistive heater element comprises a nickel alloy.
4. The device of claim 1, wherein the resistive heater element comprises an elongated conductive wire and the detectors comprise voltage detection leads placed at selected intervals along the length of the wire and the controller determines a voltage at the location of each of the wire couplings and determines the resistance information based upon the determined voltage.
5. The device of claim 4, wherein the conductive wire comprises a nickel alloy material.
6. The device of claim 1, wherein the resistive heater element comprises an etched foil layer.

7. The device of claim 1, wherein the resistive heater element is laminated to a surface of the airfoil component and wherein the controller determines whether any portion of the heater element has become delaminated from the surface using the determined temperature of the corresponding portions.

8. An airfoil assembly, comprising:
 - a component body having at least one surface;
 - a resistive heater element secured to selected portions of the surface;
 - a controller that controls operation of the resistive heater element;
 - a plurality of detectors associated with corresponding portions of the resistive heater element, the detectors providing the controller resistance information regarding the corresponding portions such that the controller determines a temperature of the corresponding portions based upon the resistance information.
9. The assembly of claim 8, wherein the controller determines whether any one of the corresponding portions has become at least partially separated from the surface using the resistance information.
10. The assembly of claim 9, wherein the controller provides an indication that at least one of the portions has become at least partially separated from the surface.
11. The assembly of claim 8, wherein the resistive heater element is laminated to the surface.
12. The assembly of claim 8, wherein the resistive heater element comprises a material having a high coefficient of resistance.
13. The assembly of claim 12, wherein the resistive heater element comprises a nickel alloy.
14. The assembly of claim 8, wherein the resistive heater element comprises an elongated conductive wire and the detectors comprise wire couplings placed at selected intervals along the length of the wire and the controller determines a voltage at the location of each of the wire couplings and determines the resistance information based upon the determined voltage.
15. The assembly of claim 14, wherein the conductive wire comprises a nickel alloy material.

16. The assembly of claim 8, wherein the resistive heater element comprises an etched foil layer of a material having a high coefficient of resistance.

17. The assembly of claim 8, wherein the controller determines whether any one of the portions of the resistive heater element is not operating consistent with a desired operation and provides an indication that at least one of the portions is not operating as desired.

18. A method of controlling a resistive heater element used to control the temperature on an aircraft airfoil component, comprising the steps of:

supplying power to the resistive heater element;

determining a resistance of each of a plurality of portions of the heater element;

determining a temperature of each of the portions using the determined resistances; and

determining whether the temperature of at least one of the portions is outside of an acceptable range.

19. The method of claim 18, wherein the heater element is laminated to a surface of the airfoil component and including determining whether at least one of the portions has become at least partially separated from the surface using the temperature information.

20. The method of claim 18, including providing an indication that at least one of the portions has a temperature that is outside of the acceptable range.